REMARKS

A petition for a one month extension of time has today been filed as a separate paper and a copy is attached hereto.

The examiner will note that claims 25 and 44 have been amended to incorporate the limitations of claims 49 and 50, respectively, and thereby respectively represent claims 49 and 50 rewritten in independent form.

1. The Objection to the Claims

The objection to claims 26, 27, 43, 49 and 50, to the extent that it remains viable given the present amendments, is respectfully traversed.

The objection to claim 26 is, of course, moot in view of the cancellation of claim 26.

The objection to claim 27, for the reason that, in the view of the examiner, it adds only apparatus limitations to claim 25 is respectfully traversed. Firstly, all claim limitations must be considered in examination. See MPEP 2143.03. Secondly, the relative susceptibility to oxidation as between the gear to be machined and the counter

gear is a process factor as is taught at page 12, lines 7-13. As taught there, where the counter gear is more oxidation resistant than the gear to be machined the counter gear can be used as a master gear in repetition of the process.

The objection to claims 49 and 50 as "being of improper dependent form for failing to further limit the subject matter of previous claim" is now moot in view of cancellation of those claims and incorporation of their language into claims 25 and 44.

Finally, the objection to claim 43 is respectfully traversed for the reason that claim 43 clearly refers to and incorporates the method of claim 25. Thus, claim 43 is a product-by-process claim. This type of dependent claim is specifically sanctioned in MPEP 608.01(n)(III) which, in relevant portion reads:

> The fact that the independent and dependent claims are in different statutory classes does not, in itself, render the latter improper. Thus, if claim 1 recites a specific product, a claim for the method of making the product of claim 1 in a particular manner would be a proper dependent claim since it could not be infringed without infringing claim 1. Similarly, if claim 1 recites a method of making a product, a claim for a product made by the method of claim 1 could be a proper dependent claim. On the other hand, if claim 1 recites a method of making a specified product, a claim to the product set forth in claim 1 would not be a proper dependent claim **> since it is conceivable that the product claim can be infringed without infringing the base method claim if the product can be made by a method other than that recited in the base method claim<. [Emphasis added.]

2. The Rejection of Claims 25-27, 31-33, 35-37 and 43 for Anticipation Or, in the Alternative, Obviousness over Hosoya in View of Praeg et al

In view of the fact that this ground of rejection was not applied to claim 49, the rejection is now moot. As noted above, claim 25 has been amended by incorporation of the limitation of claim 49 and now represents claim 49 rewritten in independent form.

Further, the hypothetical modification of Hosoya would change the essence (operative principle) of Hosoya from a purely mechanical finishing process to a chemical/mechanical process. Given the fact that the secondary reference (Praeg et al) also discloses only a purely mechanical finishing process, the examiner is attempting to conjure something out of a hypothetical combination of references that which is in no way suggested by any of the references.

Insofar as the rejection is based on anticipation, it is respectfully traversed for the reason that Hosoya does not teach use of an aqueous solution or any type of oxidative environment, or oxide removal, which limitations go to the essence of applicants' invention. The operative principle of applicants' invention is oxidation coupled with mechanical removal of the oxide (product of oxidation). Accordingly, claim 25 calls for the formation of oxide (chemical) and removal (mechanical) of the thus formed oxide. In that the operative principle of applicants' invention involves both oxidation, a chemical reaction, and mechanical removal of the oxide, it is proper to define the method of the present invention as involving "mechano-chemical action". Applicants' specification, for example at page 14, lines 7-10, teaches that the sliding and rolling contact serves to promote the oxidation. Applicants' specification repeatedly refers to the "oxidation promoting action" of the sliding and rolling contact between the gear to be

machined and the master gear. Thus, in the present invention, the sliding and rolling contact is mechanical action which both enhances the oxidation and removes the oxide.

In contradistinction, the operative principle of Hosoya is purely mechanical, devoid of chemical action and is preferably grinding, the antithesis of the present invention. See column 3, lines 31-35 and column 5, lines 51-59 of Hosoya et al.

As noted in applicants' previous response, Hosoya specifically teaches away from the operative principle of the present invention, for example at column 7, lines 20 and 21, where Hosoya teaches that an anti-corrosive atmosphere should be employed. Now, in this latest office action, the examiner argues, beginning at the bottom of page 6 and continuing through line 9 at page 7, to the effect that "corrosion" does not necessarily refer to "oxidation." However, oxidation is a type of corrosion. See the definition of "corrosion" at page 315 of Hawley's Condensed Chemical Dictionary, enclosed herewith. Note the statement in Hawley's dictionary definition which reads: "The rusting of iron is a familiar example of corrosion which is catalyzed by moisture." Accordingly, where Hosoya teaches that corrosion must be avoided that teaching would lead away from any and all corrosive atmospheres including the most common representation thereof, i.e., a moisture-catalyzed oxidative environment. It is respectfully submitted that to change the operative principle of the examiner's primary reference to obtain an effect which that reference seeks to avoid, is the antithesis of obviousness. Neither Hosoya nor Praeg teach any type of chemical finishing. Neither teaches oxidation and neither teaches oxide removal. To accept the examiner's

premise that the references are properly combinable to arrive at something (the claimed invention), quite unlike the purely mechanical finishing to which their teachings are limited, requires a leap of faith that transcends hindsight.

Hosoya does not teach or suggest use of a lubricant containing water. Applicants might agree with the examiner in his observation that "water based coolants may be especially useful in non-ferrous applications," however, the use of water-based coolants in non-ferrous applications without corrosion, and therefore without oxidation, is not suggestive of the invention as claimed. The use of water in an oxidative environment, as noted by the definition from Hawley's Dictionary, serves to catalyze the oxidation. As noted above, use of water in an oxidative environment would be contrary to the teachings of Hosoya which seeks to avoid corrosion. Use of water in an oxidative environment to catalyze oxidation, a chemical action, is contrary to the teachings of Hosoya and would serve to completely change the operative principle of the Hosoya process which is mechanical, specifically grinding. In other words, to change the process of Hosoya to make it based on a chemical effect would essentially emasculate the teachings of Hosoya and could not have been obvious from a reading of Hosoya and/or Praeg et al.

As the examiner correctly notes, Praeg et al at column 6, lines 1-7 teaches the use of water based coolants for the purpose of carrying away the particles removed by the finishing tool. That teaching is not suggestive of the use of water to catalyze an oxidation reaction. Again, the use of water to catalyze an oxidation reaction is contrary

to the specific teachings of Hosoya and would serve to completely change the operative principle of Hosoya in a manner in no way envisioned by or suggested by the teachings of either Hosoya or Praeg et al.

At page 3 of the office action the examiner writes: "Regarding the steps of oxidizing the surface, it is noted that oxidation would naturally follow from machining oil having aqueous base which are usually used in the art especially for non-ferrous gears as evidenced by the cited references..." While oxidation might "naturally follow" from the use of machining oil having an aqueous base in the machining of ferrous gears, it would not "naturally follow" in the machining of non-ferrous gears. Without oxidation, there is nothing resembling the present invention in which the operative principle involves oxidation.

Claim 27 further distinguishes the present invention from Hosoya because the differential between materials of the gears, in terms of susceptibility to oxidation, would make no sense in the context of Hosoya which does not utilize oxidation (or oxide removal) in his process but, rather, seeks to avoid an oxidative (corrosive) atmosphere. It is noted that the examiner has not mentioned the limitations of claim 27 and has not stated a *prima facie* case for any ground of rejection thereof.

The office action gives no clue as to where in Hosoya one might find a suggestion of the dual motion, relative movement of the gears as recited by claim 31.

Likewise, it is noted that the examiner has not stated a *prima facie* case for any ground of rejection of claim 32, claim 33, claim 34 or claim 35. No reference of record suggests repeatedly increasing and decreasing distance between axes of the gears as recited by claim 32, and the examiner has not asserted the contrary. No reference of record suggests finishing with the axes of the gears intersecting each other at an approximately right angle (claim 34), with reciprocably tilting (claim 33) or with relative movement of the position of the contact (claim 35).

3. The Rejection of Claims 28, 29, 34 and 38 as Obvious Over Hosoya et al or Hosoya et al in view of Praeg et al

This rejection is respectfully traversed for substantially the same reasons given above. Again, to use an oxidative atmosphere, specifically a water-catalyzed oxidative atmosphere, for the purpose of promoting oxide formation and subsequent removal thereof is an operative principle involving a chemical action which is in no way suggested by the purely mechanical action involved in the process of Hosoya. Likewise, Praeg et al in no way suggest a water catalyzed oxidative atmosphere for promotion of oxide formation and subsequent removal of the oxide, as a method of finishing gear surfaces. Even if the examiner were correct in the context of a non-ferrous metal, i.e., in the context of a process which would be devoid of oxidation, that hypothetical, a suggestion of which the examiner purports to find in the combined reference teachings, would not be a suggestion of machining by oxidation with oxide removal and would not be a suggestion of the invention as claimed here.

With regard to claim 34, use of gears oriented with their axes "at an approximately right angle" is completely contrary to the strictly parallel orientation employed by the references and cannot properly be characterized as "changing shape" ("shape" of what?) as asserted by the examiner. Further, if, *arguendo,* within the ordinary level of skill in the art, that would not equate to a *prima facie* case of obviousness absent legally sufficient motivation to have made the allegedly obvious modification. *Ex parte Gerlach,* 212 USPQ 471 (PTO Bd. App. 1980).

4. The Rejection of Claim 30 for Obviousness Over Hosoya or Hosoya in View of Praeg et al or Further in View of Igarshi

Claim 30 further distinguishes the present invention from that of Hosoya in that utilization of one of the corrosive agents recited by claim 30 would be contrary to teachings of Hosoya to the effect that a corrosive atmosphere should be avoided. The examiner's statement that such the use of such corrosive agents would have been motivated by a desire "to provide wear resistance and/or to reduce thermal shock" is totally unsupported, unsupportable, and erroneous in that the corrosive agents would reduce, not enhance, wear resistance.

5. The Rejection of Claim 44 for Obviousness

This rejection is respectfully traversed for the reasons given above in that the essential features of applicants' invention, i.e., use of a water catalyzed oxidizing atmosphere, oxide formation on the surfaces of the gear tooth and subsequent removal

of the oxide are in no way suggested by the basic combination of Hosoya and Praeg et al. Accordingly, even if modified in the manner allegedly suggested by Takahashi et al, the result would still not be the present invention.

6. The Rejection of Claims 39-42 for Obviousness

This rejection is also traversed for the reason that the basic combination of Hosoya et al and Praeg et al does not suggest a chemical finishing process of the type claimed here or of any other type. The teachings of McGlasson et al, while perhaps relevant to the further limitations of claims 39-42, lead away from the present invention in that McGlasson et al teach use of an abrasive, i.e., a lapping compound.

7. The Rejection of Claims 45-48 for Obviousness

The rejection of claims 45-48 for obviousness over Hosoya or Hosoya in view of Praeg et al is respectfully traversed. Claim 45 has been amended in the manner of the language of claims 49 and 50 to further define the nature of the counter gear. In contradistinction, the only gear used for machining and described by Hosoya in any detail is the master gear 2 described by Hosoya at column 3, lines 31-35 as having diamond grains electro-deposited onto its toothed surfaces.

Claim 48 serves to further distinguish the apparatus of the present invention from that disclosed by Hosoya, Praeg et al or suggested by any combination thereof.

Neither Hosoya nor Praeg et al disclose apparatus which serves to change the position of contract of meshing portions of the counter gear and the gear to be machined.

In conclusion, it is respectfully requested that the examiner reconsider the rejections of record with a view toward allowance of the claims as amended.

Respectfully submitted,

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Hawley's Condensed Chemical Dictionary

ELEVENTH EDITION

Revised by

N. Irving Sax
and
Richard J. Lewis, Sr.

VNR VAN NOSTRAND REINHOLD
New York

southwestern US. Its special properties are extreme lightness, relatively impervious to water, resilient structure, and low rate of heat transfer. These account for its usefulness as bottle stoppers, insulation, wallboard, life preservers, gaskets, and sound-deadening insertions. D 0.1–0.25 g/cc. Combustible.

corkboard. A mixture of ground cork and paper pulp formed into thick sheets for insulating purposes.

"Colar."[28] TM for chemical resistant finishes having a base of polyamide catalyzed epoxy resins.

Cornforth, John. (1917-) An Australian born chemist who won the Nobel prize for chemistry in 1975 with V. Prelog for work on the chemical synthesis of organic compounds. Although deaf since childhood, he attained his doctorate from Oxford and held prestigious posts all over the world, as well as authoring many papers on organic and biochemical subjects.

corn oil. (maize oil).
Properties: Pale yellow liquid, characteristic taste and odor. Insoluble in water; soluble in ether, chloroform, amyl acetate, benzene, and carbon disulfide; slightly soluble in alcohol. D 0.914–0.921, saponification value 188–193, iodine value 102–128, flash p 490F (254C), combustible, nontoxic and nondrying, moderate tendency to spontaneous heating. Chief constituents: Linoleic and oleic acids (unsaturated), palmitic and stearic (saturated).
Derivation: The germ of common corn (Indian corn, Zea mays) is removed from the grain and pressed.
Grade: Crude, refined, USP, technical.
Use: Foodstuffs, soap, lubricants, leather dressing, factice, margarine, salad oil, hair dressing, solvent.

cornstarch. A carbohydrate polymer derived from corn of various types, composed of 25% amylose and 75% amylopectin. A white powder which swells in water, it is the most widely used starch in the US. The so-called waxy variety (made from waxy corn) contains only branched amylopectin molecules. Its chief uses are as a source of glucose, in the food industry as a filler in baking powder and a thickening agent in various food products, and in adhesives and coatings. It has been proposed as an additive to plastics to promote rapid degradation in such products as bottles and waste containers.
See also starch.

corn steep liquor. The dilute aqueous solution obtained by soaking corn kernels in warm 0.2% sulfur dioxide solution for 48 hours as the first step in the recovery of corn starch, corn oil, and gluten from corn. The solution contains mineral matter as well as soluble organic material extracted from the corn. It is used as a growth medium for penicillin and other antibiotics, and it is also concentrated and used as an ingredient of cattle feeds.

corn sugar. See dextrose.

corn syrup. See glucose syrup.

"Corobex."[159] TM for a series of organotin salt compounds, phenylmercuric salt compounds, and quaternary compounds used as bacteriostatic and fungistatic finish in the textile, plastics, and rubber industries.

corona. An electrical discharge effect which causes ionization of oxygen and the formation of ozone. It is particularly evident near high-tension wires and in spark-ignited automotive engines. The ozone formed can have a drastic oxidizing effect on wire insulation, cable covers, and hose connections. For this reason, such accessories are made of oxidation-resistant materials such as nylon, neoprene, and other synthetics.

coroxon. (O,O-diethyl-O-(3-chloro-4-methylcoumarin-7-yl)phosphate).
Hazard: A cholinesterase inhibitor.
Use: Insecticide, fungicide.

corresponding states. (reduced states).
Two substances are in corresponding states when their pressures, volumes (or densities), and temperatures are proportional respectively to their critical pressures, volumes (or densities), and temperatures. If any two of these ratios are equal, the third must also be equal. This principle has been useful in the development of physical and thermal properties of substances.

corrosion. (1) The electrochemical degradation of metals or alloys due to reaction with their environment, which is accelerated by the presence of acids or bases. In general, the corrodability of a metal or alloy depends upon its position in the activity series. Corrosion products often take the form of metallic oxides. This is actually beneficial in the case of aluminum and stainless steel, for the oxide forms a strongly adherent coating which effectively prevents further degradation. Hence, these metals are widely used for structural purposes. The rusting of iron is a familiar example of corrosion which is catalyzed by moisture. Acidic soils are highly corrosive. Sulfur is a corrosive agent in automotive fuels and in the atmosphere (as SO_2). sodium chloride

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Derivation: The germ of common corn (Indian corn, Zea mays) is removed from the grain and pressed.
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